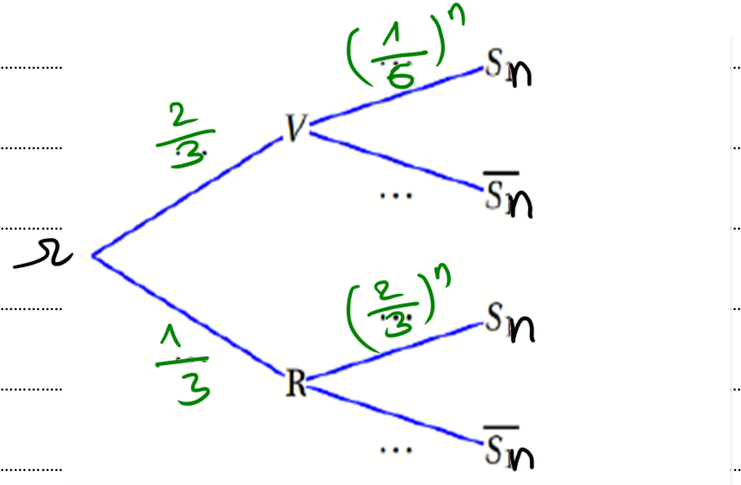
c) $p(R/S_n) = \dfrac{p(R \cap S_n)}{p(R)}$

$= \dfrac{\frac{1}{3} \times \frac{2}{3}}{\frac{1}{3}} = \dfrac{2}{3}$

2) a)



*) $p(S_n) = p(S_n \cap V) + p(S_n \cap R)$

$= \dfrac{2}{3} \times \left(\dfrac{1}{6}\right)^n + \dfrac{1}{3} \times \left(\dfrac{2}{3}\right)^n$

b) $p_n = p(R/S_n) = \dfrac{p(R \cap S_n)}{p(S_n)}$

$= \dfrac{\frac{1}{3} \times \left(\frac{2}{3}\right)^n}{\frac{2}{3} \times \left(\frac{1}{6}\right)^n + \frac{1}{3} \times \left(\frac{2}{3}\right)^n}$

$= \dfrac{\left(\frac{2}{3}\right)^n}{2 \cdot \left(\frac{1}{6}\right)^n + \left(\frac{2}{3}\right)^n} \times \dfrac{\left(\frac{3}{2}\right)^n}{\left(\frac{3}{2}\right)^n}$

$= \dfrac{1}{2 \cdot \left(\frac{1}{4}\right)^n + 1}$